Please amend the two paragraphs beginning at page 10, line 23 and continuing through page 11, line 29, as follows:

The TOFMS 30 geometry integrates the capabilities of different types of instruments. Each type of instrument can be employed separately, or the different types of instruments can be used in parallel to achieve the additional advantages which characterize each different type of instrument. This TOFMS 30 geometry is less costly to construct and maintain. For example, several components and systems, such as vacuum pumps, power supplies, and portions of the data acquisition systems, are redundant and can be integrated to achieve cost savings. For example, the interface regions normally employed with ESI sources 28-1 and ICP sources 28-n generally have similar vacuum requirements. The TOFMS 30 geometry permits a single vacuum pump to be employed to evacuate the first stages of both vacuum interfaces, and the second and third stages of vacuum of each the ESI source 28-1 and the ICP source 28-n can be served by a single high-vacuum pump, for example, a turbomolecular pump. Additionally, the TOFMS 30 geometry permits the use of ion optics 38-1, 38-2, . . . 38-n optimized for the ion currents and ion energies produced by each distinct source 28-1, 28-2, . . . 28-n, respectively. For example, and with reference to Fig. 1, it will be appreciated that many of the ion optic electrodes 38-1, 38-n are shared by both the ESI and ICP cycles of the TOFMS 30 operation. ~~If the instrument is operated in a sequential manner, the detection system 34-1, 34-2, . . . 34-n can be switched rapidly among multiple ion-beam producing systems 28-1, 28-2, . . . 28-n, monitoring the output of the ESI detector 34-1 and the ICP detector 34-n in alternating fashion.~~ This permits the achievement of greater sensitivity and requires less sample material than is available with a common, compromise ion optics system.

The orthogonal extraction region 35 geometry of the TOFMS 30 permits analysis of ions 32-1, 32-2, ...32-n produced by multiple ionization sources 28-1, 28-2, 28-n simultaneously or in ~~rapid sequence~~ an interdigitated manner. Referring to Fig. 1, the sources 28-1, 28-n are oriented 180° from each other, and ions are extracted continuously in opposite directions. Each source has a distinct, differentially pumped vacuum interface in order to transfer ions from their current pressure, for example, atmospheric pressure, into a vacuum environment. Because each interface is distinct, it can be tailored to the ion flux and energy produced by the respective source 28-1, 28-n. The ion beams obtained from the sources 28-1,

28-n are then collimated and introduced into the same extraction region 35, where they are extracted for mass analysis. Because the ionization sources 28-1, 28-n are oriented in different directions, they attain different trajectories 40-1[[.]] , 40-n within the drift region of the TOFMS 30 and, consequently, can be detected separately at different ion detectors 34-1, 34-n. By ~~sequentially, or time-division, multiplexing~~ interdigitating or simultaneously performing these extraction events, ~~that is, by extracting the ions 32-1, 32-n from each respective source 28-1, 28-n in an alternating manner,~~ the different types of chemical information are obtained in a very rapid manner. In ~~some cases~~ essence, all the ions 32-1, . . . 32-n from multiple sources 28-1, . . . 28-n, respectively, can be extracted into the mass analyzer at the same time.

Please amend the paragraph beginning at page 18, lines 11-21, as follows:

Figs. 3A-D illustrate several potential extraction region 35 geometries useful with methods and apparatus constructed according to the invention. The extraction region 35 is defined generally as the region between repeller 56 and a first acceleration electrode 58. Ions are extracted for mass analysis by application of a voltage pulse VR to one or both of the electrodes. Again, the simplest form illustrated in Fig. 3A, a single region with no beam offset, projects ion beams from ion sources 28-1, 28-n along the same axis, but in opposite directions. In this embodiment, a single extraction pulse might simultaneously inject ions from sources 28-1, 28-n into the acceleration region. As the ions travel through the potential gradient, the ion energy distributions of the ion populations are identical. Thus, many of the same ion optics and reflectron 52 potentials can be employed for sources 28-1, 28-n.

Please amend the paragraph beginning at page 19, lines 19-30 as follows:

As previously noted, extractions from multiple sources 28-1, . . . 28-n can be accomplished simultaneously or ~~time-division multiplexed~~ interdigitated. When ions 32-1, . . . 32-n from multiple sources 28-1, . . . 28-n are injected simultaneously into the TOFMS 30, the repetition rate of the instrument will be limited by the lesser (least) of the attainable repetition rates for the particular sources 28-1, . . . 28-n. As previously discussed, this, in turn, will depend upon the mass ranges in question, the ion beam energies, and the size(s) of the extraction region(s) 35. As an illustration, consider an instrument having an ESI ion source 28-1 and an

ICP ion source 28-n, parameters as discussed above, and an extraction region 35 of the type illustrated in Figs. 3A-C. Fig. 6 illustrates a timing sequence of such a system. The duration of each step in the sequence is scaled in the horizontal direction of increasing time. The vertical dimension illustrates different spectra.

Please amend the two paragraphs beginning at page 20, line 15 and continuing through page 21, line 13, as follows:

In other embodiments, extractions occur ~~sequentially~~ in an interdigitated manner (e.g. see Fig. 7). Ion gating methods and ion gating apparatus 60-1, . . . 60-n are employed to stop ion beams from all sources 28-1, . . . 28-n but one, 28-k, from entering the extraction region 35. The ion beam from source 28-k is permitted to fill the extraction region 35. By thus interdigitating the spectra, refill time is the only limiting factor. A highly diagrammatic view of a TOFMS 30 including gating of two sources 28-1, 28-n, an illustrative timing sequence and illustrative gating sequences for such ~~a time-division multiplexed~~ an interdigitated embodiment are illustrated in Figs. 7A-D, respectively. A sequence using the apparatus illustrated in Fig. 7A might proceed as follows: first, an ICP-TOFMS extraction sequence; immediately followed by filling the extraction region 35 with ions from an ESI ion beam. By limiting the detector size to less than 3.8 cm, the ESI ions can be extracted at the point following completion of the acquisition of the ICP mass spectrum. Again, this will be about 28 μsec. Immediately thereafter, the ion gates 60-1, 60-n are switched, as illustrated in Figs. 7C-D, cutting off access by the ESI ions 32-1 to the extraction region 35, and permitting the ICP ions 32-n to begin to fill the extraction region 35. Shortly thereafter, for example, in about 2.8 μsec, the ICP ions 32-n will have filled the extraction region 35 sufficiently to provide a reasonably accurate sample, and an ICP mass spectrum is collected. Because of the relatively much longer time to obtain an ESI spectrum, it may be beneficial to keep the ICP ion beam gate 60-n open and obtain another ICP mass spectrum before closing the ICP gate 60-n and reopening the ESI beam gate 60-1 to extract another ESI spectrum. This way, during the time that the second ESI spectrum data is being collected, both ICP spectra can be analyzed. Then, this sequence of steps can be repeated.

While the disclosure has been illustrated and described in detail in the foregoing description, such illustration and description is to be considered as exemplary and not restrictive in character, it being understood that only the preferred embodiments have been shown and

described and that all changes and modifications that come within the spirit of the disclosure are desired to be protected. For example, the single extraction region 35 in the present design could be replaced by two or more extraction regions 35-1, ...35-n, all of which are configured to send ions simultaneously or ~~sequentially~~ in an interdigitated manner to a single detector 34.